anatomically, for they have that kind of accuracy which no artist who is not the investigator and author ever can portray.

As a work of reference and a storehouse of accurate information, Prof. Eisler's monograph will be invaluable.

(3) In the notes upon the other two volumes we have been dealing with facts, normal and pathological; but in Dr. Rádl's excursion into transcendental philosophy we are invited into the realms of ultra-Bergsonian casuistry, which is certainly not the normal environment of the biologist. The major part of his book is devoted to a discussion of the comparative anatomy of the visual organs and related nervous structures, chiefly of invertebrate animals; and the author uses these facts, or rather his speculative interpretation of them, as the ammunition for an attack upon the usual methods of biological argument, and especially upon theories of phylogenesis. It is easy to see why he chose the visual organs for this purpose: the data relating to the other sensory mechanisms, if employed as he uses his materials, would all have pointed in the direction opposite to that desired by Dr. Rádl. But the retina grows out from the central nervous system: therefore it is not formed by the influence of environment; it is the material expression of the "neue Lehre" that the mind makes its own instruments! This is the kind of argument, if such speculations can be called argument, that Dr. Rádl indulges in. It seems to the reviewer that Dr. Rádl has not sufficiently acknowledged his indebtedness to Bergson; but, on the other hand, his statement lacks even the superficial plausibility of Bergson's writings.

OUR BOOKSHELF.

Tracks of the Sun and Stars, A.D. 1900 *to* A.D. 37900. Photographs from Stereoscopic Perspective Drawings made at Tenby, A.D. 1912–13. By Thomas Edward Heath. Pp. 17 + photographs. (London: W. Wesley and Son; Manchester: Flatters and Garnett, Ltd., n.d.) Price 5*s*. net.

IT has probably occurred to many who are interested in the study of stellar motions that it would be instructive to have a model of those star-tracks which are known, so that the phenomena in the three-dimensional aspect might be more easily grasped. By means of Mr. Heath's stereoscopic drawings it is now possible to have such a model before our eyes, and to see in a vivid manner the complex system of motions of a portion of the stellar universe. We have been delighted with the clearness with which the varying inclinations and directions of the interlacing movements are shown. Perhaps the most striking impression is the very considerable change of relative position which takes place in the selected interval of 36,000 years—a period by no means long from the astronomical point of view. The great range of difference in the speeds of the stars is also brought out prominently.

In order to ascertain the complete motion of a star, the proper motion, radial motion, and parallax must be known, the parallax being generally much the most uncertain of these quantities. In some cases where the value is small, Mr. Heath's tracks are rather hypothetical; but recent researches have increased considerably the number of trustworthy parallaxes, and the data used for these drawings appear to be well selected on the whole. Two views are given, in one of which the observer is supposed to be removed 100 light-years, and in the other 200 light-years, from the present position of the sun. The letterpress contains useful instructions for the reader who wishes to make for himself other drawings of this character.

A. S. E.

Die europaeischen Schlangen. Kupferdrucktafeln nach Photographien der lebenden Tiere. By Dr. Fritz Steinheil. Erstes Heft. (Jena: Gustav Fischer, 1913.) Price 3 marks.

ALTHOUGH there is no lack of good figures of most of the snakes of Europe, yet these are mostly executed from preserved specimens. We therefore welcome the publication, of which the first fascicle has just appeared, undertaken by the enterprising firm of Gustav Fischer, in which Dr. Steinheil intends to represent, by means of photographs taken from living examples, the different species of snakes inhabiting Europe, as well as their principal varieties. The five copper-plates now issued could scarcely be surpassed.

The letterpress accompanying each plate is short, and deals merely with the geographical distribution and the habits in captivity; no information is given concerning the mode of reproduction, a subject of particular interest not only to the herpetologist, but also to the amateur who keeps snakes in the terrarium. No systematic order is followed, but a brief introduction explains the classification followed, which, as well as the nomenclature, is in accordance with the British Museum catalogue of snakes, also adopted in Schreiber's recently issued second edition of the "Herpetologia Europæa." In fact, as the author tells us in the preface, this work is intended to serve as an atlas to the "Herpetologia Europæa," and as such will prove of great service.

G. A. B.

Die Methoden der exakten, quantitativen Bestimmung der Alkaloide. By Prof. Anton Ritter von Korczynski. Pp. iv + 82. (Berlin: Gebrüder Borntraeger, 1913.) Price 3.50 marks.

THIS little work deals with the methods by which alkaloids may be accurately determined quantitatively, but not with the methods by which the total alkaloids may be extracted from crude drugs or their preparations, although an appendix of fifteen pages contains the details of the alkaloidal drug-assays of the German Pharmacopœia. One-third of the book is devoted to the determination

© 1913 Nature Publishing Group

of quinine; morphine and the opium alkaloids, and strychnine and brucine, occupy the next places of importance, whilst the remaining alkaloids are very briefly discussed. It is essentially a compilation, and, like all compilations, has a distinct value. In this case the value is somewhat adversely affected by the scanty treatment that some of the alkaloids have received. Thus the separation of emetine from cephaëline is simply mentioned, although Paul and Cownley showed long ago how it could be effected, and Farr and Wright have published a method for the accurate determination of colchicine, to which no reference is made; indeed, the results obtained by English workers in this field have been sadly neglected. The utility of the work would be much enhanced by a more thorough examination of the literature.

Manual of Wireless Telegraphy and Telephony. By A. F. Collins. Third edition. Pp. xv+300. (New York: John Wiley and Sons; London: Chapman and Hall, 1913.) Price 6*s.* 6*d.* net.

This edition differs from the first, which was reviewed in the issue of Nature for February 14, 1907 (vol. lxxv., p. 366), in several respects. The improvements in apparatus, and the advances made in wireless telegraphy in other directions, have led Mr. Collins to extend his treatment of the apparatus of a commercial station, and to describe the transmitting and the receiving instruments in separate chapters. The suggestions to operators relating to the management of stations are more exhaustive, and other useful additions have been made.

LETTERS TO THE EDITOR.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of* Nature. *No notice is taken of anonymous communications.*]

Artificial Hiss.

Can any of your readers tell me how to make an artificial hiss? I have heard something like one from steam blowing off at a safety-valve. There the pressure was very high, but in the mouth a hiss is made with a moderate pressure behind. The problem must have been faced by inventors of speaking machines, but I do not know with what success. The best that I have been able to do myself is by blowing through a rubber tube nipped at about half an inch from the end with a screw clamp, but the sound is perhaps more like an *f* than an *s*.

There is reason to think that the ear, at any rate of elderly people, tires rapidly to a maintained hiss. The pitch is of the order of 10,000 per second.

Rayleigh.

Terling Place, Witham, Essex.

An Application of Mathematics to Law.

I would not have troubled you with further correspondence on this subject but for the fact that Mr. Potts's letter (April 24, p. 187) illustrates in a remarkable way the value of a knowledge of the fundamental principles of mathematics when possessed by persons occupied in work often apparently of a very unmathematical nature.

Mr. Cripps (May 15, p. 270) appears to belong to the unfortunately too prevalent class of individual who mistakes algebra for mathematics, and he bases his objection entirely on the purely algebraic equation $I=M+i$. He completely overlooks the fact that Mr. Potts's method is based entirely on the great and powerful conception of *functionality*. But if I understand Mr. Potts correctly, the problem in which he is an expert consists in determining the forms and characteristics of certain functions, and not in the mere numerical solution of equations.

G. H. Bryan.

Overheated Water.

The experiment of Dufour, in which drops of water were suspended in a mixture of linseed oil and oil of cloves, and heated to 120° C. without boiling, is seldom repeated for class demonstration, presumably owing to the difficulty of preparing a mixture of the oils exactly equal in density to water at the temperature named. The phenomenon may be shown with ease and certainty, however, by employing a mixture of four volumes of ethyl benzoate and one volume of aniline instead of the mixture of oils, the procedure being as follows:—Place 80 c.c. of ethyl benzoate and 20 c.c. of aniline in a beaker, and surround by a bath of glycerine or strong sulphuric acid. Heat the bath until the temperature of the mixture is 125° C., and then add 2 to 5 c.c. of freshly boiled water by means of a pipette. The water will sink at first, and rest on the bottom of the beaker; but on attaining the temperature of the mixed liquids it will break up with some violence into spheres of various sizes, which remain floating in the liquid so long as the equi-density temperature of 125° C. is maintained. It is advisable to place a cover over the beaker to prevent the fuming of the mixture.

For lantern projection, a copper vessel, square in section, and having two opposite sides of patent plate-glass, will be found satisfactory, glycerine being used to surround the beaker and the temperature raised gradually.

Chas. R. Darling.

City and Guilds Technical College, Finsbury, E.C.

"Coal, and the Prevention of Explosions and Fires in Mines."

I must point out that some of the statements in your review of the above book in Nature of April 24 are inaccurate.

"Great explosions do not, as Dr. Harger imagines, travel either exclusively or generally against the direction of the ventilating currents." What I say in the book (p. 78) which your reviewer is presumably criticising is this:—"All big dust explosions are similar to the one at Altofts. Ignition is followed by quiet combustion for 50–100 yards, then the wave of progressive combustion gathers speed, and finally attains a velocity approaching that of detonation, and races through the dust and air at a speed of 50–100 miles per minute. Such dust explosions always proceed *against* the current of air; sometimes they go the other way also, but seldom reach the working faces. As a rule the branch of an ignition which travels with the air current fails to develop violence," &c.

Every dust explosion in a mine on record *has* travelled against the air current, and the *reason* for this is clearly put in my paper on gob fires and the prevention of gob fires in mines, which your reviewer quotes, and also on pp. 98–100 in the book.

Your reviewer quotes Proc. Roy. Soc., vol. xxviii.,

© 1913 Nature Publishing Group